

**IEM**

Integrated Environmental Management, Inc.

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September 16, 2005

Mr. David R. Smith
Shieldalloy Metallurgical Corporation
12 West Boulevard, PO Box 768
Newfield, NJ 08344**Re: Assessment of Distribution Coefficients and Leachability for Licensed Materials**

Dear Mr. Smith:

Shieldalloy Metallurgical Corporation (SMC) is currently storing many tons of slag and bag house dust from a former ferrocolumbium production operation at its Newfield, New Jersey site. Because those operations were licensed by the U. S. Nuclear Regulatory Commission (USNRC) and because they are no longer ongoing, SMC is pursuing decommissioning of the site and termination of the radioactive materials license. The decommissioning methodology being pursued is On-Site Stabilization and Long Term Control, or the LTC Alternative.

In order to demonstrate that the LTC Alternative will meet the USNRC's dose criteria for release of the Newfield site for restricted use, dose modeling using the RESRAD computer code (v. 6.22) will be performed.¹ A site-specific distribution coefficient based on the leachability of the thorium-contaminated slag and bag house dust is an important input parameter to the RESRAD model. While default distribution coefficients are available as part of the code's supporting data base, the unusual physical and chemical characteristics of the slag and baghouse dust were thought to present actual distribution coefficients that differ significantly from the defaults. Therefore, an assessment of the radionuclide release rate from the slag and the baghouse dust, using the toxicity characteristic leaching process (TCLP) as described in EPA Method 1311 and an assessment of the distribution coefficients (or K_d) from ASTM D4319, was performed. The purpose of this report is to describe the assessment protocol and summarize the results.

Protocol Description

On February 7, 2005, I sent you instructions for collecting and shipping samples of slag to a commercial analytical laboratory. Attachment A contains a copy of those instructions. On February 9, 2005, three samples of slag were collected from the SMC Storage Yard pursuant to those instructions. All were received by the laboratory on February 14, 2005.² There one of the samples was analyzed for leachate by TCLP and an assessment of K_d was performed. For the remaining two samples, only a K_d determination was made.

¹ Yu, C, Zielen, A.J, et al, *User's Manual for RESRAD Version 6*, ANL/EAD-4, Argonne National Laboratory, Argonne, Illinois, July, 2001.

² The analyses were performed by Outreach Laboratory of Broken Arrow, Oklahoma. Outreach is a NELAC-accredited laboratory (Certification ID No. OK001).

On July 19, 2005, two samples of baghouse dust were collected from the Storage Yard pursuant to the instructions in Attachment A. These were then shipped to the same laboratory, where they were recorded as received on July 22, 2005 and subsequently analyzed for leachate by TCLP.

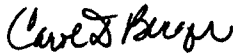
Results

Attachment B is a table that summarizes the results for the radionuclides present in SMC's licensed radioactive materials. Attachment C contains the Certificates of Analysis that were issued by the laboratory. We recommend these data be used as input to future dose modeling using the RESRAD computer code.

Thank you very much for the opportunity of assisting you in the acquisition of this important data. If I can answer any questions or provide you with additional information on this or any other radiation-related matter, please do not hesitate to call me at (240) 631-8990.

Sincerely,

INTEGRATED ENVIRONMENTAL MANAGEMENT, INC.

A handwritten signature in cursive script, appearing to read "Carol D. Berger".

Carol D. Berger, CHP

File 94005.01

ATTACHMENT A
Sample Collection Instructions

**IEM**

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February 7, 2005

Mr. David R. Smith, RSO
Shieldalloy Metallurgical Corporation, Inc.
West Boulevard, Post Office Box 768
Newfield, New Jersey 08344

Re: Slag Sampling Program for Determination of Leachability

Dear Mr. Smith:

The purpose of this letter is to provide you with instructions for collecting, packaging and shipping samples of ferrocolumbium slag in order to test for leachability. The following are the procedural steps that should be followed:

1. Select a reasonably sensitive hand-held survey instrument to guide you in the selection of samples.³ Follow your standard procedures for assuring the performance of the instrument prior to use (i.e., RSP-008, "Instrumentation").
2. Complete a "Sample Collection and Survey Form" (enclosed).
3. Go to a location on the property that you will designate a "background" location (i.e., ambient exposure rates that are less than 20 microR per hour), measure the ambient exposure rate in that location, and record that value on the Form.
4. Leave the hand-held instrument at the background location, then collect a football-sized sample of slag from the slag pile, noting the collection location on the Form. (If you like you may do a drawing on the back of the Form showing the slag piles with respect to the perimeter fence, and the sample collection location.)
5. Take the sample back to the background location and position the survey instrument so that the sensitive area of the detector is within 0.25 inches of the surface of the slag at each measurement point. The meter reading and units should be recorded on the Form. Carefully evaluate the position of the range selector switch when observing the meter reading!
6. If the contact exposure rate on the sample is significantly the pre-recorded background, place the sample into a baggie or other collection container and record the sample number on the Form and on

³ A micro-R meter (Ludlum Model 19 or equivalent) or GM Survey Instrument is recommended.

the container.⁴ If the contact exposure rate is only marginally different from background, it is possible that the sample is a columbium or ferrovanadium slag sample, which *is not* what should be analyzed. Discard that sample and repeat steps 4 through 6 using another football-sized sample.

7. Place the collection container, a copy of the Form and a completed chain-of-custody form into a shipping container (box). Mail the container by overnight carrier (Federal Express or equivalent) to: Outreach Laboratory, Outreach Laboratory, 311 North Aspen, Broken Arrow, Oklahoma 74012. Please reference Lab Proposal No. 20040422, IEM Specification No. 94005.01 somewhere on the chain-of-custody form.
8. Forward a copy of the overnight carrier waybill and the completed form to me at IEM's Gaithersburg, Maryland address.

A report of findings that includes the analytical data package and supporting documentation will be forwarded to you shortly after we receive the analytical results. Outreach has specified a turn-around time of 20 business days from the date of sample receipt for one of the tests, and 45 work days for the other. IEM will track the status of this commitment.

If you have any questions or if I can provide you with more detailed instructions, please give me a call at (240) 631-8990. Thank you for the opportunity of assisting you in this interesting project. I am looking forward to its timely and successful completion.

Sincerely,

[original signed by]

Carol D. Berger, C. H. P.

File 94005.01

⁴ If collecting more than one sample, use a sequential numbering scheme such as "SMC-021005-1", where "SMC" is the company identifier, "021005" is the date of collection, and "1" is the sample number.

ATTACHMENT B
Summary of Results

Sample ID	Sample Type	Result Type	Units	Results						
				Ra-226	Ra-228	U-238	U-234	Th-228	Th-230	Th-232
2-9-05-001	Slag	K _d	ml/g	77	54	293000	75300	23289	65400	129000
2-9-05-001	Slag	Gross Activity	pCi/g	578	393	297	279	469	334	484
2-9-05-001	Slag	TCLP	pCi/l	1180	5480	1.2	6.2	25.4	2.82	<1.86
2-9-05-002	Slag	K _d	ml/g	51.7	35	9100	7930	2900	12700	17100
2-9-05-002	Slag	Gross Activity	pCi/g	428	91.3	274	253	226	135	254
2-9-05-003	Slag	K _d	ml/g	60.6	38	23100	13700	23300	65400	129000
2-9-05-003	Slag	Gross Activity	pCi/g	275	122	137	120	317	71.1	307
7-19-05-01	Baghouse Dust	Gross Activity	pCi/g	67	123	25.5	22.5	99	40.6	79.1
7-19-05-01	Baghouse Dust	TCLP	pCi/l	20.2	12.4	12.2	13.5	1.53	<0.551	0.732
7-19-05-02	Baghouse Dust	Gross Activity	pCi/g	17.3	32.7	10.2	10.4	37.2	20.4	37.7
7-19-05-02	Baghouse Dust	TCLP	pCi/l	11.6	7.79	12.8	13.1	1.13	<0.44	0.343

ATTACHMENT C
Certificates of Analysis